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# Human Resources Planning Manual

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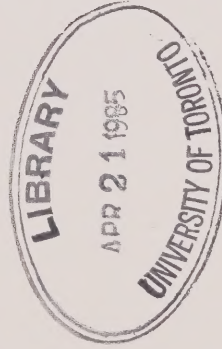
Employment and  
Immigration Canada

# Human Resources Planning Manual

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Ontario Manpower Commission

March, 1982



Government  
Publications

CA20N

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- 82 H76



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## What is human resources planning?

Human resources planning is often defined as:

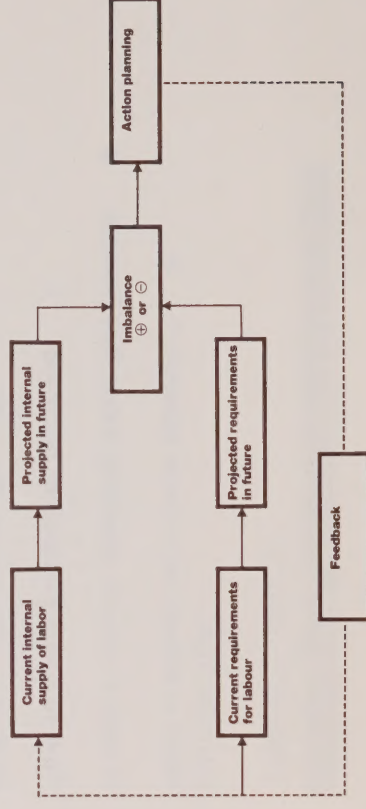
*“A process concerned with providing the right number and kinds of people, at the right place, at the right time, doing things which help to fulfill company as well as individual objectives”*

### ... balancing labour requirements and availability

Human resources planning can also be considered in terms of the economist's concept of supply and demand. The manager attempts, through the human resources planning process, to establish an equilibrium or balance between his future demand (or requirement) for different types of labour and his anticipated supply (or availability) of labour. In effect, the manager plans for his *human* resources just as he plans for the many *material* resources required for the firm's production processes, such as plant, equipment, raw materials and, of course, operating capital.

Thus, the human resources (or manpower) planning process is similar in concept to the firm's other planning activities, as it involves:

## Human resources planning process



- first projecting the firm's manpower requirements as indicated by the firm's current business operations and future business plans;
- next, projecting the manpower available within the company, based on the firm's present workforce;
- then, comparing these two sets of projections; and finally
- formulating action plans to correct any imbalances between the two sets of projections.

### ... an integral part of business planning

Since the basic purpose of manpower planning is to serve the firm's productive and organizational goals, manpower planning cannot be carried out in isolation or apart from the organization's other planning activities. Indeed, manpower planning must be undertaken and implemented as a thoroughly integral part of the firm's overall business planning.

Manpower planning therefore requires significant input from your firm's corporate planning section, the various production units or departments as well as the involvement of your personnel branch.

### **...a process with wide-ranging organizational effects**

In this kind of overall corporate planning framework, manpower planning serves as the spearhead of an integrated and comprehensive human resources management system. The personnel function is enhanced by formalized manpower planning which can be used to direct and coordinate a variety of human resource development activities such as training, skill upgrading as well as a rational recruitment and compensation program. As the experience of many business firms shows, when properly implemented and pursued, manpower planning can help to improve motivation, job satisfaction and performance of the organization's workforce.

### **... this Manual helps guide you through the process**

But, while the concept of manpower planning may be straightforward and its benefits obvious and appealing, the implementation of the process may require considerable expenditure of time and organizational effort.

The extent of this effort depends on the size of your workforce, the nature of your operations and, in particular, the amount of detail of information you may wish to use in your planning. We hope that by leading you step-by-step through this process, the material in this Manual will help your firm in implementing and carrying on a meaningful human resources planning program.

## **Human resources planning using this Manual**

The planning process used in this Manual consists of four major steps. Two of these steps examine current and projected manpower requirements for your organization, the third step looks at your present and future workforce, and the final step matches future requirements with future workforces and helps formulate action planning. A number of planning schedules is associated with each step. These schedules are used to carry out the actual planning process.

Let's look at each of these four steps in a bit more detail:

### **Step 1**

#### **Current production or customer service operations, business plans and their manpower requirements (MPR)**

##### **Schedule 1**

- your current business operations which generate revenue are examined and the relationship between product/service output and labour input is analyzed
- because different products/services may require different staffing levels, individual products/services or lines of related products/services are examined

##### **Schedule 2**

- applying this analysis to your business plans for the future (because your output levels and planned production techniques will affect staffing levels), manpower requirements will be projected

### Step 2

**Current administrative or support functions, future functions, plans and their manpower requirements (MPR)**

#### Schedule 3

—this time, your administrative/support functions, planned functions and manpower requirements for administrative/support personnel are examined

Although both of these steps are concerned with projecting future manpower requirements, we make a distinction between the two because the basis for projections may be different for these two types of personnel. We are assuming that staffing levels in revenue-generating production/service operations will vary with the output levels of various different products/services. Manpower requirements for these operations are projected using a simple mathematical technique in Step 1.

In some administrative/support functions, like sales or technical support, MPR may also vary with the output of individual products/services or with overall output levels. In these functions, your MPR projection technique will be similar to Step 1. But in other functions, such as clerical support, MPR may vary irregularly. In yet other functions, such as general maintenance staff, MPR may remain relatively constant over long periods of time. In these functions, your MPR projection may be based on different factors, such as prior organizational experience or current industry averages.

In the final analysis, you should use whichever method gives you the best result in projecting requirements for each type of personnel.

### Step 3

**Current workforce and manpower available internally**

#### Schedule 4

—your workforce is not a static, unchanging object: its composition changes as employees retire, quit, are promoted, transferred, etc. — so you should develop an inventory of your current workforce and their recent movements

#### Schedules 5, 6 & 7

—then, you can project future employee movements and determine (using your choice of techniques) how many of your current workforce will remain over the planning period

### Step 4

**Matching and action planning**

#### Schedules 8 & 9

—finally your manpower requirements from Steps 1 and 2 are matched against your supply from

#### Step 3

—then, on the basis of this information, action plans to correct any imbalances (either shortages or surpluses) can be formulated

## How to begin manpower planning

### Using the summary chart

If you have read the Ontario Manpower Commission's *Introductory Guide to Human Resources Planning*, you will be familiar with the summary chart located at the end of this section. If not, take a moment now to look over the summary chart.

The summary chart illustrates the four-step planning process described above. This chart can be used as a very basic planning instrument, in cases where your workforce is very small or where you are interested in recording your initial estimates only. If you wish to calculate or quantify any aspect of the process in greater detail, the planning schedules in this Manual can be used to supplement or replace the summary chart at any, or all, of the steps in the planning process. In this case, the summary chart can be used to collect the data from each of the various planning schedules you use. The summary chart will also refer you to the appropriate planning schedules for each segment of the planning process.

### Assembling data for the planning schedules

As noted in the previous section, there are nine planning schedules, each of which is part of one step in the planning process. A data guide for each step in the process accompanies the planning schedules associated with that step. The data guide will suggest to you what types of data or information you will need for the different planning schedules. It will also give you hints on where to find the data and how to summarize or aggregate data to reduce your workload. You will also find that by varying the levels of aggregation or the amount of detail on each schedule, you can analyze aspects of your operation at different levels. For example, you

may wish to look at a best-selling product or a predominant occupational group in greater detail than you would examine smaller and less significant aspects of your operation.

Each schedule carries detailed instructions for its use, as well as an example of how it can be used. You'll probably need more than one copy of each schedule, so use the *schedules in the Manual as masters for reproduction, rather than as actual working papers*.

### Adapting the Manual to your own organization

This Manual gives you an outline of the basic manpower planning process along with a set of planning instruments to help you implement that process in your company. Of course, situations may exist or arise in any organization which are unique to that organization and which may not fit precisely into the Manual's standard format. You should feel free to modify or alter the planning schedules in the Manual to suit your own particular needs, while keeping within the framework of the basic planning process.

In addition, as we have mentioned earlier, you can choose different levels of detail and aggregation while assembling your data, and different schedules, charts and techniques to project manpower requirements and supply. These options are just another way of tailoring the Manual to your needs.

### Multi-year planning cycle

Most of the planning schedules in the Manual are designed for a one-year planning period. To plan more than one year in advance (we would suggest a three- to five-year planning horizon), *make as many copies of each planning schedule as you need for each one-year planning period.*

#### Cycle for projecting requirements . . .

Projections of manpower requirements (Steps 1 and 2) can be made for any number of successive future planning periods, since these projections are independent of other steps in the process and of other projections once you've performed the necessary analysis of current requirements. Thus, if you are planning five years forward, you could do all the manpower projections for the five periods at the same time.

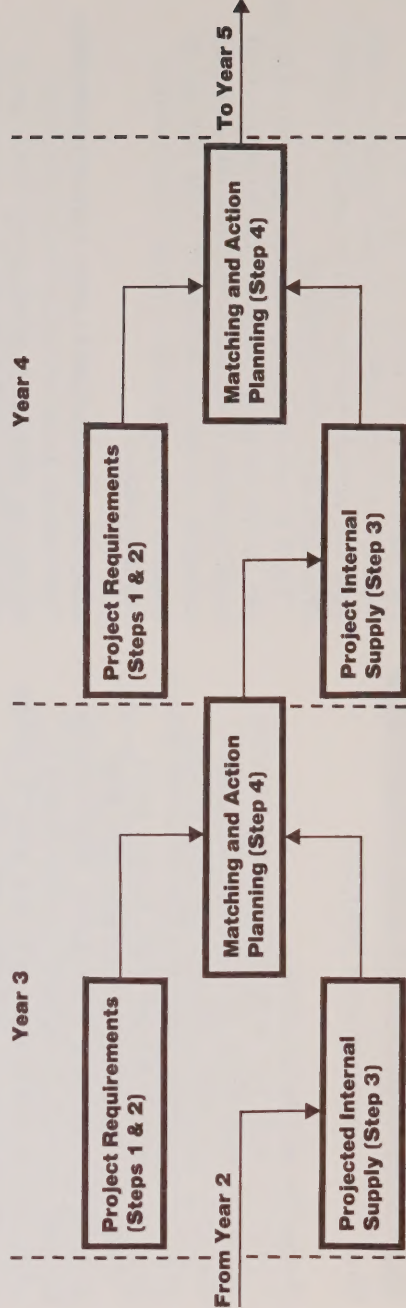
#### . . .differs from cycle for projecting supply

This is not the case with the projections of manpower supply. If you will examine the planning

schedules in Step 3 which are used to project manpower supply, you will see that they work on the basis of estimating or projecting the number of employees you will lose over each planning period (e.g., turnover or attrition), then subtracting that number from the number employed at the beginning of the period. If you use the projected supply of each planning period as the basis for the next planning period, and then subtract your turnover from that basis, your estimated supply will gradually dwindle away over a number of periods. You will be left with increasingly large imbalances to correct.

Therefore, complete all four steps of the planning process for each one-year planning period before you move on to the next planning period. Use the *planned* employment levels from Step 4 of each period as the basis for projecting supply (Step 3) in the next period. (Of course, for your first planning period — next year — you'd use your current employment as the basis for projection).

### Multi-year planning cycle



If you require any further assistance with your manpower planning efforts, or if you have any questions about this Manual or suggestions for its improvement, please contact:

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## Other aspects of planning

Plans should never be regarded as being “carved in stone”, but must be continually updated and re-viewed. Even the best of plans can be overtaken by events. Therefore, manpower planning cannot be treated as a sporadic activity, but must be regarded as a continual, ongoing process involving periodic reviews and adjustments in the light of changing conditions.

The manpower planning process, and particularly its projection element, can generate unique problems. For instance, attempts to approach absolute accuracy in projections would be futile and counter-productive. Although projections can be made quite accurately, errors can never be reduced to zero. Also, a good projection which stimulates corrective action will, in turn, eliminate the projected problem. So, don’t scrap your manpower planning system simply because your projected shortages failed to materialize!



**Summary chart:**  
**Human resources planning process**



# Summary chart: Human resources planning process

Step 1:

Production/customer service: present			
What products or customer services do you currently sell?	What are your sales of each? (\$ 000s or units)	<div><div></div><div>You can examine the relationship between products/customer services and their current employment requirements using Schedule 1</div></div>	Summarize the types of occupations of workers you need for your production service
			How many workers in each are needed?

Your future requirements for production/customer service personnel will be influenced by such business planning factors as:

- change in output volume
- change in product mix
- introduction of new processes and equipment

So, you will need to set down your business plans before you look at your human resource requirements

Step 2:

Administrative/support functions: present			
What administrative/support functions are currently provided within your company?	<div><div></div><div>You can examine individual administrative/support functions in greater detail using Schedule 3</div></div>	Summarize the types of occupations of workers you require for these functions	How many workers in each are needed?

Your requirements for administrative/support personnel will be influenced by planning factors such as:

- change in number of production personnel
- new process or equipment
- contracting out of functions

Once again, you will have to set down your plans before looking at your human resource requirements

Planned/projected									
What products/customer services do you plan to sell in the next 5 years?		<div><div></div><div>You can project manpower requirements by occupation for individual products/customer services using Schedule 2 For multi-year planning, you can estimate a schedule for each year of the planning period</div></div>	Summarize the types of occupations you will require for this planned production/service					How many workers in each occupation will you require?	
			1st yr	2nd yr	3rd yr	4th yr	5th yr		

Transfer requirements for each occupation for matching against available internal supply



To Step 4

Planned/projected									
What administrative/support functions do you plan to provide in the next 5 years?		<div><div></div><div>You can estimate or project manpower requirements for individual planned functions using Schedule 3</div></div>	Summarize the types of occupations you will require for these functions					How many workers in each occupation will you require?	
			1st yr	2nd yr	3rd yr	4th yr	5th yr		

Transfer for matching



To Step 4

<p><b>Step 3:</b></p> <p><b>Current workforce</b></p>	<p>Which occupations do you currently employ?</p>	<p>How many employees do you employ?</p>
<p>You can record current employment and new employee hire events on Schedule 5. If you have many employees, you can examine current age distribution using Schedule 5</p>		

11-12-13-14-15-16-17-18-19-20-21-22-23-24-25-26-27-28-29-30-31-32-33-34-35-36-37-38-39-40-41-42-43-44-45-46-47-48-49-50-51-52-53-54-55-56-57-58-59-60-61-62-63-64-65-66-67-68-69-70-71-72-73-74-75-76-77-78-79-80-81-82-83-84-85-86-87-88-89-90-91-92-93-94-95-96-97-98-99-100-101-102-103-104-105-106-107-108-109-110-111-112-113-114-115-116-117-118-119-120-121-122-123-124-125-126-127-128-129-130-131-132-133-134-135-136-137-138-139-140-141-142-143-144-145-146-147-148-149-150-151-152-153-154-155-156-157-158-159-160-161-162-163-164-165-166-167-168-169-170-171-172-173-174-175-176-177-178-179-180-181-182-183-184-185-186-187-188-189-190-191-192-193-194-195-196-197-198-199-200-201-202-203-204-205-206-207-208-209-210-211-212-213-214-215-216-217-218-219-220-221-222-223-224-225-226-227-228-229-230-231-232-233-234-235-236-237-238-239-240-241-242-243-244-245-246-247-248-249-250-251-252-253-254-255-256-257-258-259-260-261-262-263-264-265-266-267-268-269-270-271-272-273-274-275-276-277-278-279-280-281-282-283-284-285-286-287-288-289-290-291-292-293-294-295-296-297-298-299-300-301-302-303-304-305-306-307-308-309-310-311-312-313-314-315-316-317-318-319-320-321-322-323-324-325-326-327-328-329-330-331-332-333-334-335-336-337-338-339-340-341-342-343-344-345-346-347-348-349-350-351-352-353-354-355-356-357-358-359-360-361-362-363-364-365-366-367-368-369-370-371-372-373-374-375-376-377-378-379-380-381-382-383-384-385-386-387-388-389-390-391-392-393-394-395-396-397-398-399-400-401-402-403-404-405-406-407-408-409-410-411-412-413-414-415-416-417-418-419-420-421-422-423-424-425-426-427-428-429-430-431-432-433-434-435-436-437-438-439-440-441-442-443-444-445-446-447-448-449-450-451-452-453-454-455-456-457-458-459-460-461-462-463-464-465-466-467-468-469-470-471-472-473-474-475-476-477-478-479-480-481-482-483-484-485-486-487-488-489-490-491-492-493-494-495-496-497-498-499-500-501-502-503-504-505-506-507-508-509-510-511-512-513-514-515-516-517-518-519-520-521-522-523-524-525-526-527-528-529-530-531-532-533-534-535-536-537-538-539-540-541-542-543-544-545-546-547-548-549-550-551-552-553-554-555-556-557-558-559-560-561-562-563-564-565-566-567-568-569-570-571-572-573-574-575-576-577-578-579-580-581-582-583-584-585-586-587-588-589-590-591-592-593-594-595-596-597-598-599-600-601-602-603-604-605-606-607-608-609-610-611-612-613-614-615-616-617-618-619-620-621-622-623-624-625-626-627-628-629-630-631-632-633-634-635-636-637-638-639-640-641-642-643-644-645-646-647-648-649-650-651-652-653-654-655-656-657-658-659-660-661-662-663-664-665-666-667-668-669-670-671-672-673-674-675-676-677-678-679-680-681-682-683-684-685-686-687-688-689-690-691-692-693-694-695-696-697-698-699-700-701-702-703-704-705-706-707-708-709-710-711-712-713-714-715-716-717-718-719-720-721-722-723-724-725-726-727-728-729-730-731-732-733-734-735-736-737-738-739-740-741-742-743-744-745-746-747-748-749-750-751-752-753-754-755-756-757-758-759-760-761-762-763-764-765-766-767-768-769-770-771-772-773-774-775-776-777-778-779-780-781-782-783-784-785-786-787-788-789-790-791-792-793-794-795-796-797-798-799-800-801-802-803-804-805-806-807-808-809-810-811-812-813-814-815-816-817-818-819-820-821-822-823-824-825-826-827-828-829-830-831-832-833-834-835-836-837-838-839-840-841-842-843-844-845-846-847-848-849-850-851-852-853-854-855-856-857-858-859-860-861-862-863-864-865-866-867-868-869-870-871-872-873-874-875-876-877-878-879-880-881-882-883-884-885-886-887-888-889-890-891-892-893-894-895-896-897-898-899-900-901-902-903-904-905-906-907-908-909-910-911-912-913-914-915-916-917-918-919-920-921-922-923-924-925-926-927-928-929-930-931-932-933-934-935-936-937-938-939-940-941-942-943-944-945-946-947-948-949-950-951-952-953-954-955-956-957-958-959-960-961-962-963-964-965-966-967-968-969-970-971-972-973-974-975-976-977-978-979-980-981-982-983-984-985-986-987-988-989-990-991-992-993-994-995-996-997-998-999-1000-1001-1002-1003-1004-1005-1006-1007-1008-1009-1010-1011-1012-1013-1014-1015-1016-1017-1018-1019-1020-1021-1022-1023-1024-1025-1026-1027-1028-1029-1030-1031-1032-1033-1034-1035-1036-1037-1038-1039-1040-1041-1042-1043-1044-10

	Q1	Q2	Q3	Q4	Total
How many of your current work-force in each occupation will remain in each of the next five years?					

▶

▶ 39

[illegible]

### From Steps 1 and 2

[illegible]

### From Steps 1 and 2

[illegible]

mismatches in any occupation you can start planning training and development activities using Schedule 9

## Data Guide: Step 1

### Current production or customer-service operations, business plans and their manpower requirements (MPR)

The purpose of this step is to project the manpower requirements of your planned revenue-generating operations. The amount of labour input into each unit or dollar of sales of your current products/services is measured. Using these figures, you can project your manpower requirements (MPR) for your planned output. Thus, your MPR are tied directly to your business plans.

#### Schedule 1

##### Current product/customer-service operations

This schedule is used to determine the labour input for products/services.

##### (1.) Summarize your current revenue-generating products and/or customer-service operations

- you'll need one copy of Schedule 1 for each product/service
- Suggestion for Simplification: since you're concerned with labour input at this point, check your list of products/services to see if any have similar types of labour input (e.g., the same occupations spending similar proportions of time on the product/service)*
- products/services with similar types of labour input can be grouped together as "lines" of products/services and analyzed on the same sheet

##### (2.) Assemble output data (Columns 2, 3, 4)

- you'll need the output of each product/service or line of products/services over the past twelve months
- you should choose between counting output by units produced or dollar sales
- "units produced" may be irrelevant in a service organization (you could develop some other measure of customer-service, e.g., calls made, people served, etc.)
- "dollar sales" must be corrected to exclude sales from prior period inventory and adjust for the effects of inflation (particularly when projecting forward), since you are concerned with sales or projected sales of *current* production/service only
- this data should be readily obtainable from sales and production records

##### (3.) List occupations required (Column 6)

- examine each product/service (perhaps in collaboration with your production departments) to see which occupations are directly involved in production/servicing
- this might include, for example, any number of levels of supervisors, and technical support personnel fully or partly assigned to the product/service
- the concern at this point is to include occupations where MPR would fluctuate with changes in the output of the product/service
- be sure to note any contract labour which may be *directly* involved in production/servicing
- remember, "occupation" refers to an employee's function in your organization, not his or her qualifications; a manager with an engineering degree is still a manager
- Suggestion for Simplification: you can group occupations with similar skills together, provided these skills can be easily transferred from one occupation to the other — for example, "maintenance electricians" and "construction electricians" could be grouped together as "electricians" or all your unskilled or semi-skilled occupations could be grouped together — be sure you're consistent across all products/services and administrative/support functions*

##### (4.) Determine employment by occupation (Columns 5, 7)

- basically, this is the *total* input (Column 5) into the product/service, and that total broken down by occupation (Column 7)
- labour input into each unit or dollar of sales of the product/service is determined in Column 7 (Manpower Requirements Indicators)
- if you are in a business where you must bid for contracts, this type of data can probably be found

in your organization since it is used in the cost-estimation process

- other organizations may use systems such as job carding, standard hour books, or incentive-pay which could be used to quickly develop this data
- otherwise, data can be developed from production department records — you may have to rely on the informed estimates of production supervisors for breakdowns by occupation
- employment should be measured in man-years employed over the past twelve months: one man-year equals one man working for one year — you can adjust these figures to take sickness, absenteeism, etc. into account
- it is very possible, particularly if your employees work in more than one area or product group or function, that your labour input will be measured in fractions of man-years
- e.g., 3 people work half the time on one product and half the time on another, their input into each is 1.5 man-years

## Schedule 2 Business plans and their manpower requirements

Using the analysis of labour input in Schedule 1, this Schedule projects MPR based on your business plans.

### (1.) Determine your planning period

- you'll need one copy of Schedule 2 for each one-year planning period of each product/service or line of products/services analyzed in Schedule 1
- e.g., for 5 product/services and a four-year planning period, you'll need 20 copies of Schedule 2
- you'll also need one copy of Schedule 2 for each one-year planning period for any new products/services you intend to launch

## (2.) Examine business plans for manpower implications

- of course, you'll need planned output levels for each planned product/service or line of products/services
- you'll also need to know how planned changes in work processes or the introduction of new equipment will affect MPR in terms of numbers and occupations

## (3.) Transfer manpower requirements indicators (MPRI)

- for existing products/customer services, transfer manpower requirements indicators (MPRI) for each occupation from Column 8 or 9 of the appropriate Schedule 1
- for new products/services, you'll have to estimate MPRI's based on experience, industry averages, etc. unless MPRI's from existing products/services are applicable

## (4.) Aggregate data

By the time you're finished with this step, you'll have a lot of paper lying about. At this stage . . .

- data in the columns indicated can be aggregated on the summary chart
- or, MPR can be aggregated by occupation on Schedule 8; be sure that any grouping of occupations you may have done is consistent across all types of schedules at this stage

- Complete one copy of this schedule for each product or customer service or each product/customer service line.
- Schedules can be forwarded to departmental managers for completion if you wish to obtain detailed information kept in records at that level or to involve departmental managers in the planning process.
- Aggregate data by occupation on a copy of this schedule, and transfer to the fold-out summary sheet.

- When determining employment by occupation (Columns 7 & 8), you may wish to use estimated data in Column 8 or more accurate data in Column 7, depending on the quality of data available or on the significance of the product/service under analysis.
- Accurate data may be more difficult to develop, but should improve the quality of projections in Schedule 2.

**Schedule 1: Current product/  
customer service operations**

Product/customer service output				Labour input			Employment by occupation for this product/customer service (see notes above)			Manpower requirements indicators (MPRI) by occupation (divide Column 2 or Column 4 by entry in Column 7)*	
1. Name of individual product/customer service or product/customer service line	What is this year's output of this product/customer service?			5. What is your total employment (in man years) working on this product/customer service?	6. What types of occupations do you require for this product/customer service?	7. In man-years		8. As % of total (Column 5)	9. Sales per man-year	10. Units per man-year	
	2. In dollar sales	3. As a % of total sales	4. In number of units								
*If you think these indicators may be changing over time (e.g., your workforce is becoming more efficient with experience) you may wish to consider using the time series analysis table (in the supplementary section of the manual) to obtain a more representative indicator.											

Background Data: used in all schedules

Examples: The example set illustrates some of the methods used in the Manual. These examples follow the manpower planning process of a fictionalized Ontario company through the planning schedules of the Manual.

Ibex has one principle manufacturing location, employing 431 people, as well as a separate head office. Support services such as hourly-rate payroll, personnel, purchasing, material/production control and engineering are administered at the plant; others are managed directly at the company's plant. Of the 431 employees at the company's plant, 349 are hourly-rated production workers, many of whom are highly skilled tradesmen. Ibex has decided to move towards self-sufficiency in skilled

trades training over the next five years, and is implementing a manpower planning system to facilitate that process.

foremen). Each foreman, in turn, directs the activities of a group of 20 to 25 production workers.

Example: Schedule 1

Production operations in the manufacturing section of the plant are managed by two general foremen who report to the general manager. Each is responsible for a separate area of the plant, and has either 7 or 8 foremen reporting to him (there are 15

Employment by occupation at the end of 1981

Hourly rate	
Skill Category 1:	54
Skill Category 2:	37
Skill Category 3:	99
Skill Category 4:	17
-electronic technicians:	
Skill Category 5	63*
-machinists:	44**
-welders:	
Skill Category 6	35
-tool and die makers:	
Total	349
* (Includes 3 apprentices)	
** (Includes 2 apprentices)	
Salary: clerical staff	
Secretaries	5
Payroll clerks	5
Purchasing clerks	3
material/production	
Control clerks	6
Engineering clerks	3
Total	22
Salary: engineering staff	
Draftsmen	5
Computer operators	9
Mechanical engineers	15
Electrical engineers	5
Total	34
Salary: supervisory staff	
Clerical supervisors	3
Foremen	15
Engineering supervisors	2
Personnel officer	1
Administrative manager	1
Engineering manager	1
General foremen	2
Plant/general manager	1
Total	26

Product/customer service output			Labour Input		6. What types of occupations do you require for this product/customer service?	Employment by occupation for this product/customer service (see notes above)		Manpower requirements indicators (MPRI) by occupation (divide Column 2 or Column 4 by entry in Column 7)*	
1. Name of individual product/customer service or product/customer service line	2. In dollar sales	3. As a % of total sales	4. In number of units	5. What is your total employment (in man-years) working on this product/customer service?		7. In man-years	8. As % of total (Column 5)	9. Sales per man-year	10. Units per man-year
Machine Tools			342	370.3	general foreman	2			171
					foreman	15			228
					technician	196			1.8
					machinists	14			24.7
					welders	61.5			5.6
					tool & die makers	43			7.5
					mat./prod'n supervisor	38.5			8.9
					mat./prod'n supervisor	5.3			67.5
					total	370.3			342

Ibex has decided to measure its product output in terms of units

These supervisory personnel obviously work closely with production personnel and the company has judged that requirement for them will vary with product output.

Although not considered as production personnel, material/production control personnel at Ibex work closely with production groups on the shop floor. Therefore, Ibex has judged that requirements in this area will vary with product output.

The apprentices in these occupations were judged to lose one-half a man-year of labour input each, due to inexperience, time off for classes, etc.

Thus, 63 (above) minus 3 apprentices times one-half man-year equals 61.5 man-years, etc.

Since the proportions of labour input vary little from one of its products to another, Ibex will analyze one product line: machine tools

Skills for jobs in the first three categories of hourly rated personnel can be acquired in anywhere between a few days and a month. Because occupations in these three skilled categories are therefore largely interchangeable, they have been grouped together as unskilled labour.

These employees always work 40-hour shift, i.e., they each work 10% more. Thus, 35 (above) plus 3.5 (10% of 35) = 38.5 man-years.

One clerk of the 6 (above) was on long-term disability for most of the year.

3 new technicians were hired in September, 1981 (two-thirds through 1981) to meet increased requirements - i.e., the three worked a total of 1 man-year in 1981.

Due to turnover, one position was vacant most of the year. Thus, 17 employed at year end (above) minus two (incomplete year worked by the 3 new hires), minus one (ongoing vacancy) equals 14 man-years.

Schedule 2: Business plans  
and their manpower  
requirements

- Complete one copy of this schedule for each product/customer service (line) planned for this period
- Aggregate data by occupation on a copy of this schedule, and transfer to the foldout summary chart
- For multi-year forward planning, complete successive copies of this schedule, each based on data from preceeding schedules

- Be sure that the MPRI used is consistent with your output projections (e.g., use MPRI in man-year per unit with output in units)

Projecting manpower requirements (MPRI)

- For existing products/customer services which will be continued through the planning period, you will require manpower requirements indicators (MPRI's) calculated on Schedule 1

- For new products/customer services, you will have to estimate MPRI's, based on industry averages, prior experience, etc., unless MPRI's from existing products/services are applicable

Page \_\_\_\_\_ of \_\_\_\_\_ this schedule  
For the one-year planning period  
from \_\_\_\_\_ 19\_\_\_\_  
to \_\_\_\_\_ 19\_\_\_\_

Business plans			Manpower requirements (MPRI)				
1. Name of planned product/customer service or planned product/customer service line	What is your planned output of this product/service for the planning period? <div>2. Dollar sales      3. Units</div>	4. Percentage change in output from prior period (e.g., Schedule 1 or preceeding period Schedule 2)	5. What types of occupations will you require for this product/customer service?	6. MPRI by occupation from Schedule 1 Column 9 or 10	7. MPRI by occupation, effect of change in output only: divide Column 2 or 3 by Column 6	8. What will be the effect on MPR by occupation of the introduction of new work processes or equipment? (either percentage change or man-years + or -)	9. Final MPR by occupation: Column 7 + Column 8
Briefly describe any changes in work processes or equipment planned for this product/customer service (note effects on manpower requirements in Column 8).							
			▲ Data for transfer to summary chart ▲				

The company anticipates that more and more if its sales will come from advanced computer-numerical-control machine tools. Ibex plans to expand its current facilities and to integrate new equipment, including computer-aided design devices, into its work processes to meet the increased demand for its products.

This example illustrates the company's first planning periods but Ibex will project manpower requirements for all five of its

planning periods at this time (see the multi-year planning cycle section on page 8 of the introduction).

### Example: Schedule 2

Although Ibex anticipates a strong market for its labour-saving products through to 1986, the company is hesitant to expand too rapidly. It plans an average growth rate of 16% over the next five years, with sales revenue reaching a target figure of \$60 million (in 1981 dollars) by the end of 1984.

Product line, output measure and occupational groupings are consistent with previous schedule

Business plans			This data has been transferred from the previous schedule			Manpower requirements (MPR)		
1. Name of planned product/customer service or planned product/customer service line and sub-	What is your planned output of this product/service for the planning period?		4. Percentage change in output from prior period (e.g. Schedule 1 or preceding period Schedule 2)	5. What types of occupations will you require for this product/customer service?	6. MPR by occupation from Schedule 1 Column 9 or 10	7. MPR by occupation, effect of change in output only; divide Column 2 or 3 by Column 6	8. What will be the effect on MPR by occupation of the introduction of new work processes or equipment? (either percentage change or man-years + or -)	9. Final MPR by occupation: Column 7 + Column 8
	2. Dollar sales	3. Units						
Machine Tools		400	17%	general foreman foreman "unskilled" labour electronic technician machinists welders tool & die makers mat./prod'n control clerk mat./prod'n supervisor electronic serv'd technician	171 22.8 1.8 24.4 5.6 7.9 8.9 64.5 34.2	2.3 17.5 232.2 16.4 71.4 58.6 44.9 6.2 1.2	- - - +5 M - yr. = 71.4 x 15% = 11.1 - - - estimated requirement	2.3 17.5 232.2 21.4 71.4 - 11.1 = 60.3 50.6 40 6.2 1.2 3
Briefly describe any changes in work processes or equipment planned for this product/customer service (note effects on manpower requirements in Column 8).								
- employ excess capacity to limit - 400 units - shift to more CNC orders requires estimated 5 more man-years of electronic fitting - introduce CAD equipment to tool room & engineering - estimated effect: - increase tool & die maker output to 10 units/m-yr - decrease machinists downtime 15% thru greater tool reliability - require servicing in direct relation to amount of usage								

The company's business plans which will affect manpower requirements are listed

## Data Guide: Step 2

### Current administrative or support functions, future functions, plans and their manpower requirements (MPR)

The purpose of this step is to project the manpower requirements of operations which do *not* produce goods or services for sale to a customer. For some of these operations, you may be able to project manpower requirement (MPR) based on some output-related statistic. In other functions, you'll have to rely on informed estimation of MPR.

**Schedule 3**  
**Current administrative/support functions, planned administrations and manpower requirements**  
 This schedule gives a framework for examining current functions and estimating MPR in planned future functions.

#### (1.) Summarize your current and planned administrative/support functions; examine each function

- after you've completed Schedules 1, 2 and 3, you should have listed *all* aspects of *all* current and planned activities of your organization
- as noted in the Data Guide for Step 1, functions with similar types of labour input can be grouped together
- since you're concerned with developing reliable MPR projections, examine each current and planned function to see whether its MPR varies directly with some measure of output which is reflected in your business plan
- e.g., MPR for employees in sales or accounts receivable functions may vary with overall sales in dollars

- for these output-related functions, MPR projection should be carried out using Schedules 1 and 2 (one copy of Schedule 1 for each function; one copy of Schedule 2 for each one-year planning period of each planned function) — use the Data Guide for Step 1 for these functions
- you'll need one copy of Schedule 3 for each of the other current functions, as well as one copy of the planning section of Schedule 3 for each one-year planning period of each planned function

## **(2.) Assemble employment data (Column 2, 3, 4)**

- this data should be readily obtainable from personnel data
- as noted in the Data Guide for Step 1, occupations with similar skills can be grouped together
- be sure to note any contract labour which may be directly involved in providing this function

## **(3.) Examine business plans for manpower implications**

- you'll need to know about changes in the function itself (e.g., contracting out, change in level or type of service, etc.) and the effect of those changes on MPR in terms of numbers (+ or –) and occupations
- you'll also need to know how planned changes in work processes or the introduction of new equipment will affect MPR in terms of numbers and occupations

## **(4.) Aggregate data**

- data in the columns indicated can be aggregated on the summary chart
- or, MPR can be aggregated by occupation on Schedule 8, be sure that any grouping of occupations you may have done is consistent across all types of schedules at this stage

In this step, the focus of your attention shifts from the requirements, or demand side of manpower planning to the supply side. Your current workforce is examined, and, using this data, your future internal supply of manpower is projected. Three alternative methods for projecting this internal supply are provided.



Example: Schedule 3

As noted previously, many of the Ibex plant's administrative/support functions are run directly from its head office. An administrative manager who reports to the general manager oversees the small plant administration section which handles hourly rate payroll, personnel, purchasing and material/production control.

There is also a larger manufacturing-engineering group, which provides design and some research support to the plant. The head of this section, the engineering manager, also reports to the general manager.

Ibex plans to expand existing administrative/support functions at the plant; no new functions will be added. However, administrative data processing at the plant will be integrated into the head office's ad-

ministrative computer system. Previously, computer operations at the plant had been confined to the manufacturing and manufacturing engineering sections.

This example illustrates the company's first planning period.

The company decides to analyze plant administration and manufacturing engineering separately, as the nature of the two functions is different.

The company has judged that payroll clerks and purchasing clerks can be interchanged with relative ease, and has aggregated them together.

Unlike production foremen and general foremen (examples: Schedules 1 and 2), requirements for the top supervisor at the plant will not vary with output

Employment by occupation can be calculated in man-years on this schedule if you wish

Employees in these occupations regularly work overtime (4 hours, on a 40-hour shift, for 10% overtime)

Current functions				Planned changes		Manpower requirements (MPR)			
1. Name and brief description of function	2. How many people do you employ in this function?	3. What types of occupations do you employ in this function?	4. How many of each do you employ?	5. Describe any planned changes in this function over the planning period e.g. - changes in work processes or equipment - changes in level of service - contracting in or out, etc.	6. Occupations affected	7. Change in employment level	8. What types of occupations will you require for this planned function (note Column 3 and Column 6)	9. Estimated MPR: previous period employment (Column 7) + planned change (Column 8) = estimated MPR for this period (Column 9)	
Plant Administration	17	Purchasing and Payroll Clerks	8	- bring electronic data processing on-line, including reorganizing staff as necessary - no additional expansion required this period	Purchasing and Payroll Clerks	-4	Purchasing & Payroll Clerks	4	
		Clerical Supervisors	2		Data Entry Clerks	+3	Data Entry Clerks	3	
		Secretaries	4		Programmer/Analyst	+1	Programmer/Analyst	1	
		Administrative Mgr.	1				Clerical Supervisors	2	
		General Mgr.	1				Secretaries	4	
			1				Administrative Mgr.	1	
			17				General Mgr.	1	
							Personnel Officer	1	
Current functions				Planned changes		Manpower requirements (MPR)			
1. Name and brief description of function	2. How many people do you employ in this function?	3. What types of occupations do you employ in this function?	4. How many of each do you employ?	5. Describe any planned changes in this function over the planning period e.g. - changes in work processes or equipment - increased level of service - contracting in or out, etc.	6. Occupations affected	7. Change in employment level	8. What types of occupations will you require for this planned function (note Column 3 and Column 6)	9. Estimated MPR: previous period employment (Column 7) + planned change (Column 8) = estimated MPR for this period (Column 9)	
Manufacturing Engineering	42	Eng. Clerks	3	- introduce Computer-aided Design in tool room & engineering room & reorganizing staff - support increasing sales, including shift into CNC Business plans are set down and translated into manpower requirements: - new occupations are added; - existing occupations change; - existing occupations disappear	CAD Draftsmen/Operators	+3	CAD Draftsmen/Operators	3	
		Secretary	1		Eng. Computer Operators	+4	Eng. Computer Operators	13	
		Eng. Computer Operators	9		Electronic Engineers	+1.5	Electronic Engineers	7	
		Draftsmen	15		Draftsmen	-3.5	Draftsmen	3	
		Industrial/ Mechanical Eng.	5.5		Engineering Clerk	-3	Engineering Clerk	6	
		Electronics Eng.	5.5				Secretary	1	
		Draftsmen	5.5				Mechanical/Industrial Engineers	15	
		Eng. Supervisors	2				Eng. Supervisors	2	
		Eng. Mgr.	1				Eng. Manager	1	
		Total	42						

## Schedule 4

### Current workforce

This schedule examines what has happened to your current workforce over the past twelve months. Employment levels at the beginning and end of this period, as well as the average level over the period, are broken down by occupation. Similarly, employee movements (such as promotions, hirings, retirements and quits) and turnover rates are examined by occupation. As well as providing a concise data base for projecting manpower supply, this schedule, with its occupational basis, can pinpoint current problems (like excessive turnover, for instance) in individual occupations which may not be evident in an overview of your total workforce.

#### (1.) List all occupations employed by your company

- if you grouped some occupations together in Steps 1 and 2, you should use the same groupings throughout the step
- be sure that you have included *all* of your company's employees in the occupations listed throughout this step
- remember, "occupation" refers to an employee's functions, not his or her qualifications; a manager with an engineering degree is still a manager

#### (2.) Assemble data on employment levels and employee movements

- you'll need this data broken down by occupation for the past 12 months
- this data should be easy to obtain from personnel records

## Schedule 5

### Age or seniority distribution of workforce

This schedule examines the age or seniority distribution of your workforce by occupation. This analysis may be necessary because an uneven age or seniority distribution of your workforce can lead to problems of, for example, sudden unexpected surges of retirement. Turnover analysis based on examination of historical trends may not reflect this type of problem.

#### (1.) Determine whether age or seniority will be analyzed

- this decision is based entirely upon the retirement policies of your company
- e.g., do people retire at a set age, regardless of seniority, or can they retire after a certain number of years with the company?
- remember, this schedule is designed primarily for age distribution analysis; so if you are analyzing seniority distribution, you may wish to renumber the column headings to better reflect your situation
- Do not analyze age distribution and seniority distribution on the same schedule.

#### (2.) Assemble age or seniority data by occupation

- this data should be easy to obtain from personnel records

## Data Guide: Step 3

### Current workforce and manpower available internally

In this step, the focus of your attention shifts from the requirements, or demand side, of manpower planning to the supply side. Your current workforce is examined, and, using this data, your future internal supply of manpower is projected. Three alternative methods of projecting this internal supply are presented.

**Schedule 6**

**Estimation or projection of manpower available internally**

Data from Schedule 4 on employee movements and turnover rates by occupation is used in this schedule to estimate or project manpower supply

**(1.) Assemble prior period employment data (Column 2)**

- see the notes on the multi-year planning cycle on page 8 of the Introductory section of this Manual
- you'll need one copy of this schedule for each one-year planning period

**(2.) Decide which method of analysis to use for each occupation**

- your choice of method (from among the three alternatives on Schedules 6 and 7) may vary from occupation to occupation
- estimation (Schedule 6) is best used in occupations with smaller populations
- projection using turnover rates (Schedule 6) is better in medium-population occupations
- projection using retention rates (Schedule 7) is better in larger occupations
- (turnover rate projection is more accurate than estimation, and retention rate projection is more accurate than turnover rate projection. But each improvement in accuracy requires a larger population in the occupation, to ensure statistical validity)

\*be sure that all occupations employed by your company are analyzed using one of the three alternatives

**(3.) Aggregate data**

- data in the columns indicated can be aggregated on the summary chart

- or, MPR can be aggregated by occupation on Schedule 8; be sure that any grouping of occupations you may have done is consistent across all types of schedules at this stage

**Schedule 7**

**Projection of manpower available internally (retention rate)**

This analysis assumes that turnover will vary not only by occupation, but also by seniority within an occupation. Thus, any occupation examined using this analysis must be large enough that the seniority groups within it are of significant size

**(1.) Perform Schedule 4 and 5 analysis on each of the seniority groups within the occupations under analysis**

- this Schedule 4 and 5 analysis is identical to previous analysis using these schedules except that, rather than analyzing the occupation as a whole, you are looking at a series of sub-groups of the occupation
- this data should be easy to obtain from personnel records
- you'll need one copy of Schedule 4, 5 and 7 for each occupation analyzed using Schedule 7 (retention rates)

**(2.) Aggregate data**

- data in the columns indicated can be aggregated on the summary chart
- or, MPR can be aggregated by occupation on Schedule 8, be sure that any grouping of occupations you may have done is consistent across all types of schedules at this stage

- Complete for all occupations currently employed by your company
- This schedule examines employment and employee movement by occupation over the twelve-month period ending on the date indicated in the upper left-hand corner of the schedule (this is the year referred to in Columns 2-6)

## Schedule 4: current workforce

## Definitions

"Annual Turnover Rate" (Column 7): total attrition over the year (Column 6G) divided by average employment (Column 4)

"Average Annual Employment" (Column 4): the sum of employment at the beginning of the year (Column 2) and employment at the end of the year (Column 3), divided by two

Page \_\_\_\_ of \_\_\_\_ this schedule  
Year ending \_\_\_\_ 19 \_\_\_\_[illegible]

\*If you think that your turnover rates may be changing over time, you may wish to consider using the time series analysis rate table in the supplementary section of the manual to obtain a more representative rate

▲ Data for transfer to summary chart

Example: Schedule 4

Turnover at the IbeX plant is moderate for its labour market. 60 workers left the plant permanently in 1981, giving the plant a turnover rate of less than 14%. The company believes, however, that some occupational groups contribute substantially more to this rate than do other groups . . .

Promoted to foreman (although this employee is still qualified as a welder, he no longer has a welder's function in the company, and is considered, for manpower planning purposes, to have left his welder's job.)

Occupational groupings are consistent with those used previously

Includes secretaries noted under Tool & Die Maker plant administration and manufacturing engineering (two pages of Schedule 3)

Includes clerical supervisors noted under Schedule - and under plant administration page of Schedule 3

For all occupations and the total, employment at the beginning of year plus additions, minus attrition equals employment at the end of the year - e.g., (401 + 96) - 66 = 431

Employment by occupation				Employee movements during the year										7. Annual turnover rate by occupation - Column 6G - Column 4
1. Occupation	2. Employment at beginning of the year	3. Employment at end of the year	4. Average employment over the year (Column 2 + Column 3) ÷ 2	5. Additions to occupation				6. Attrition from occupation						
				A Hired	B Promoted in	C Trained in	D Total	A Terminated	B Out	C Retired	D Trained out	E Promoted out	F Total	
Unskilled	172	190	181	60		60	4	34	2			42	123	
Electronic Technician	13	17	15	9	1	10	1	5				6	4	
Machinists	61	60	60.5	1		1			2			2	103	
Machinist-Apprentices	2	3	2.5	1		1						0	-	
Welders	41	42	41.5	4		4		1	1			3	107	
Welder-Apprentices	1	2	1.5	1		1						0	-	
Tool & Die Maker	36	35	35.5	2		2			3			3	108	
Tool & Die Maker-Apprentices	7	8	7.5	2		2		1				1	13	
Eng. Clerks	3	3	3	1		1				1		1	33	
Mgt./Prod'n Control Clerks	5	6	5.5	1		1						0	-	
Secretaries	5	5	5	1		1		1				1	2	
Mechanical/Industrial Engineers	14	15	14.5	2		2			1			1	107	
Electronic/Electrical Engineers	4	5	4.5	1		1						0	-	
Draftsmen	5	5	5			0						0	-	
Eng. Computer Operator	6	9	7.5	4	1	5		2				2	126	
Foreman	15	15	15		2	2			1			3	13	
General Supervisors	3	3	3			0						0	-	
Eng. Supervisors	2	2	2		1	1						1	5	
Personnel Officer	1	1	1			0						0	-	
Eng. Mgt.	1	1	1		1	1			1			1	1.6	
Admin. Mgt.	1	1	1			0						0	-	
Business Foreman	2	2	2			0						0	-	
Business Foreman-Apprentice	1	1	1			0						0	-	
Total	401	431	416	90	4	96	5	44	11	0	2	66		

Turnover rates in smaller-sized occupational groups should not be regarded as particularly valid

Transfers out of occupations should equal transfers in

Promotions out of occupations should equal promotions in

Turnover rates in smaller-sized occupational groups should not be regarded as particularly valid

Transfers out of occupations should equal transfers in

Promotions out of occupations should equal promotions in

Although 60 people left the company (5 terminated + 44 quit + 11 retired), 66 actually left various occupations in the company



**Example: Schedule 5**  
Ibex is particularly concerned that its skilled and professional workforce is growing older. Many of these employees have been with the company for some time, and the company has not recruited many people into these occupations in recent years. Employees at Ibex have the option of retiring at age 60.

[illegible]



the first period, Ibex will move directly to action planning for that period (as noted in the multi-year planning section on page 8 of the introduction) using Schedule 8.

### Example: Schedule 6

As illustrated in the Schedule 4 example, occupational groups at Ibex vary widely in size. As illustrated in this example and the example of Schedule 7, the company uses a variety of techniques to project its internal supply of manpower.

This example illustrates the company's first planning period. After completing projections of internal manpower supply for

Retirement is the major cause of attrition in these occupations (Schedule 4); supply is projected based upon further definition of data from Schedule 5

Note transfer of data from Schedule 4

### Note transfer of data from Schedule 4

Note transfer of data from Schedule 4														
1. Occupation		2. Prior period employment: from Schedule 4 or preceding period's Schedule 8 (see notes)	3. Estimation (Skip this section if you are using turnover rate analysis)						Projection, using turnover rates		7. Projected manpower available internally at end of period: subtract Column 6 from Column 2			
			4. Estimated manpower available internally at end of period: subtract Column 3G from Column 2						5. Turnover rate from Schedule 4	6. Projected turnover over period: multiply Column 2 by Column 5				
			Anticipated or estimated attrition from various sources											
			A. Transfers out	B. Promotions out	C. Quits	D. Retirements	E. Terminations	F. Deaths	Total					
"Unskilled"		190								.23	44	146	Supply is projected by using its turnover rate	
Electronic technician		17								.4	7	10		sm
Eng. Computer Operators		9								.26	2	7		rel-as
Foremen		15								.13	2	13		sta
Machinists		60												us
Tool & Die Makers		35												
Mechanical Industrial Engineers		15												
Welders		42												
Welder - Apprentice		2												
Machinist - Apprentice		3												
Engineering Clerks		3												
Mat'l Prod'n Control Clerks		6												
Purchasing / Payroll Clerks		8												
Draftsman		5												
Electronic Eng's.		5												
Gen. Foremen		2												
Secretaries		5												

Supply is estimated in these occupations based on experience, judgement, etc., for example, during this planning period: An apprentice is due to become a journeyman  
A draftsman will probably take early retirement  
An electronic engineer will resign, having given notice during the current period. . .

Note: The estimate procedure continues through the secretarial, supervisory and managerial occupations. However, the company anticipates no turnover in these occupations during this period: supply in this period will equal current (Schedule 4) supply. . .

Based on age distribution analysis (Sch. 5) retirement will be a major cause in this occupation. But there are also causes of attrition other than retirement here. Thus, IBEX decides to use a modified turnover rate (total attrition minus retirement divided by average employment) to project the other attrition: the new rate (using schedule 4 data) is:  $\frac{3}{2} - 1$  (retirement) =  $\frac{.05}{2} = 41.5$  (average employment) = .05 (rate). Retirement is projected at 2, based on further definition of Schedule 5 data.

**Schedule 7: Projection of manpower available internally (retention rate) Occupation:**

- Complete one copy of this schedule for each occupation under this analysis
- Analysis assumes that turnover rates vary with length of service, and therefore it develops a set of rates, one for each of 9 separate groups. Thus, to ensure relatively accurate projections, analysis should only be used for occupations with relatively large populations so that each of the 9 sub-groups is of significant size
- You will require Schedule 4 (current workforce) and Schedule 5 (age distribution) data for each of the 9 seniority groups in a occupation under analysis

### Using this schedule:

—Supply is projected for each seniority group by multiplying the supply at the beginning of a planning period (which is the supply at the end of the previous planning period) by the retention rate for that group (Column 5), then subtracting the projected retirements (from Schedule 5)

As any seniority group passes through a 1-year planning period, it advances one year, and moves, at the end of the period, to the next highest level of seniority. For example, after a 1-year planning period, the *less than 1-year* group would have advanced to become the 1 to 2-year group. Of course, the 1 to 2-year group would have become the 2 to 3-year group, and so on.

3-year group and so forth. The 7 to 8-year group, however, would be added to the existing *greater than 8-year* group. This process of transferring groups is illustrated by the small arrows between the manpower retained over period and projected supply at end of period columns.

1-Note that when a group moves up in seniority, it assumes the retention rate of the new, higher seniority level for the next planning period: retention rates remain fixed at the same level of seniority throughout.

2-By extending the above principles, you can project beyond a three-year time horizon.

—By extending the above principles, you can project beyond a three-year time horizon

[illegible]

\* If you think retention rates may be changing over time, you may use the Time Series Analysis Table in the supplementary section to obtain a more representative rate

**▲Data for transfer to summary chart**

Employment by seniority

Example: Schedule 7

Ibex is concerned about the above-normal turnover in the lower skill categories of its hourly-rate personnel (see example: Schedule 4). The company, therefore, decides to use a more detailed projection of manpower available for these categories.

Skill categories 1 - 3 ("unskilled")

- Less than 1 year 39
- 1 to 2 years 26
- 2 to 3 years 23
- 3 to 4 years 21
- Greater than 4 years 81

Skill category 4 (electronic technician)  
All groups 17

However, as demonstrated, only the unskilled occupational grouping (e.g., skill categories 1 to 3) is large enough to ensure reasonably valid results using retention rate projections. Even then, the company is forced to aggregate the more senior groups in this occupation. Schedule 4 and 5 analysis of the 5 seniority groups must be performed prior to beginning Schedule 7. The supply of electronic technicians is, therefore, projected using Schedule 6.

Entered on schedule after completion of main calculations — data is from Schedule 8, Column 8F (new hires) or recruits for first planning period)

Be sure that data is collected on the right seniority group. In this case, it's the group which has become the current 1 to 2-year group (i.e., they started last year as a less than 1 year group)

Retention rates project the number of employees in each group who will stay through the year. The rate is calculated using data from the past year. The data on the 1 to 2 year group, for example, represents the passage, or aging of that group during the past year as it went from a less than 1 year group to a 1 to 2-year group. Thus, for projection purposes, this rate is applied to the less than 1 year group, to project retention as that group ages into a 1 to 2-year group during the planning period

This group will move from planned new hires (or, off-the-street) into less than 1 year seniority over the first planning period

New hires for the second planning period could be added here

Calculation of retention rate					Projection of manpower available					Retention rate is constant for each group from year to year			
1. Length of service (in years)	2. Current employment by length of service - Schedule 4, Column 3	3. Total attrition from this service group: over past year - Schedule 4, Column 6G	4. Retirements from this service group over past year - Schedule 4, Column 6C	5. Retention rate by group: use data from next highest group* Col. 2 + Col. 3	6. Projected retirements 1st year - Schedule 5	7. Manpower retained over period (Col. 2 x Col. 5) - Col. 6	8. Projected supply at end of period - Transferred Column 7 entry	9. Projected retirements 2nd year - Schedule 5	10. Manpower retained over period (Col. 8 x Col. 5) minus Col. 9	11. Projected supply at end of period - Transfer Column 10	12. Projected retirements 3rd year - Schedule 5	13. Manpower retained over period (Col. 11 x Col. 5) - Col. 12	14. Projected supply at end of period - Transfer Column 13
Planned new hires	67			$\frac{39}{39+21} = .65$	0	$67 \times .65 = 43$							
Less than 1 year	39	21	0	$\frac{26}{26+13} = .67$	0	$39 \times .67 = 26$	43						
1 to 2 years	26	13	0	$\frac{23}{23+3} = .88$	0	$26 \times .88 = 23$	26	0	$25 \times .88 = 22$				
2 to 3 years	23	3	0	$\frac{21+1}{21+2} = .91$	0	$23 \times .91 = 21$	23	0	$23 \times .91 = 21$	22	0	$22 \times .91 = 20$	
3 to 4 years	21	2	1	$\frac{20}{20+2} = .91$	0	$21 \times .91 = 20$	21	0	$21 \times .91 = 20$	21	0	$21 \times .91 = 20$	20
4 to 5 years + greater than 5 years	$20+61=81$	$1+2=3$	$0+1=1$	$\frac{81+1}{81+2} = .98$	2	$81 \times .98 = 79$ $79 - 2 = 77$	$20+77=97$	4	$98 \times .98 = 96$ $96 - 4 = 92$	$20+92=112$	5	$112 \times .98 = 110$ $110 - 5 = 105$	$20+105=125$
5 to 6 years													
6 to 7 years													
7 to 8 years + greater than 8													
Totals							167			155			145

Group advances and its population is transferred to next highest seniority level at end of period

Populations collect in the more than \_\_\_ year group

e.g., 20 in the 4 to 5-year group, 61 in the more than 5-year group

Totals correspond with data on Schedule 4

Company has cut off the last two seniority groups to ensure a good-sized population in all groups

Total new hires in the past year (from Schedule 4), 39 stayed with the company to become the current less than 1-year group

Data for rate calculation transferred from next highest seniority group

Data for the more than \_\_\_\_ year group only is carried across (this rate projects the number of people who'll stay in this aggregate group)

This analysis projects lower turnover than does the turnover rate analysis (167 retained against 146 retained using the turnover rate). Until the planned new hires are taken into consideration, the retention rate analysis does not reflect the higher turnover among the group going from planned new hires to less than 1-year. Thus, retention rate analysis gives a truer picture of turnover in the company's current workforce.

Group advances and its population is transferred to next highest seniority level at end of period

Populations collect in the more than \_\_\_\_ year group



## Data Guide: Step 4

### Matching and action planning

In this step, manpower requirements are matched against internal supply, and action plans are drawn up to correct any imbalances which come to light. You can, of course, develop a number of different action plans, and evaluate each to determine the best plan for your organization.

#### Schedule 8

##### Matching and action planning

This schedule allows you to project imbalances in your workforce using previously generated data on manpower requirements and supply. It also summarizes the action you can take to correct these imbalances

##### (1.) Aggregate previously generated data

- if you haven't done so already, collect data on MPR by occupation from Schedules 2 and/or 3 and on manpower supply from Schedules 6 and/or 7
- be sure, as mentioned previously, that:
  - any groupings of occupations are consistent across all schedules
  - you have included all occupations that you will be requiring and that you currently employ
- you'll need one copy of this schedule for each one-year planning period

#### Schedule 9

##### Action planning worksheet for individual vacancies

##### vacancies

You can use this schedule as an aid to decision-making when filling individual vacancies or shortages. It provides a concise and consistent basis for comparison between potential candidates

##### (1.) Collect data on vacancy

- Schedule 8 should provide data on the occupation in which the vacancy will occur, the size of the vacancy, when it will occur, etc.
- job descriptions should provide data on the job requirements of the vacancy

##### (2.) Collect data on prospective candidates

- personnel records or skills inventory (see Supplementary Section of Manual) can help identify potential candidates to fill the vacancy

### Adjustments of Imbalances (optional)

## Schedule 8: Matching and action planning

- Imbalances will take two forms: shortages, designated by a minus sign (–) and surpluses, designated by a plus sign (+)
- You will need data on manpower requirements by occupation from Schedule 2 and/or 3 and on manpower available by occupation from Schedule 6 and/or 7

—Thus, you may wish to consider the effects of attrition on changes in work-

force size, bearing in mind the timing of these changes. Transfer the appropriate rates from Schedule 4 and 7 to Schedule 8, Column 7

## Action planning

- Actions such as transferring and promoting affect more than one occupation, therefore be sure to note gains and losses at both ends of the transaction – e.g., transferring workers to correct one shortage may cause another shortage elsewhere. Treat this as a form of attrition which has created another imbalance to be listed on Schedule 8
- Training can require long lead-times and

thus can only be used to correct shortages in periods when the trainees are fully qualified to work in their occupation. You may wish to list long-term occupations (such as apprentices) in a separate occupation, and transfer them into the occupations they are training for when they are ready. Or, you could list them as training in their final occupations (e.g. Column 8C), with a special notation indicating when they will be qualified to work in that occupation.

—Schedule 8, Column 10: planned employment over the period should equal requirements for the period (Column 3).

Add manpower available (Column 2), and action planned (Column 8) and 9G) and projected attrition to additions (Column 6, if used), then compare the sum with the figure in Column 3

[illegible]

Example: Schedule 8

Ibex can now use the data and projections from the various copies of the different schedules to plan its human resources development activities over the next years. As noted previously, the company has decided to move towards self-sufficiency in skilled trades training. This example illustrates the company's first planning period. Once planning for the

first period is complete, the company will begin the planning cycle for the next period.

Note transfer of data from previous schedules

Note transfer of data from previous schedules

Turnover rate from Schedule 4

Using projection from retention rate analysis - Schedule 7

Counting each apprentice as contributing one-half man-years of input (as noted previously - Schedule 1)

Machinist apprentice who is completing training this period

Company is recruiting additional apprentices, each contributing one-half man-years of input

Aggregation of occupations from two different schedules (as noted previously - Schedule 4)

Matching requirements with manpower available			Adjustment of imbalances (optional - see notes)			Action planning											
1. Occupation	2. Manpower available over planning period from Schedule 6 or 7 (in man-years)	3. Manpower required over period from Schedules 2 and 3 (in man-years)	4. Imbalance (in man-years) surplus (+) or shortage (-); Column 3 from Column 2	5. Applicable turnover rate - from Schedule 4 or 1	6. Projected attrition of additional workforce over planning period (in man-years) (-)	7. Net imbalance over period; Column 4 + Column 6	8. Action to correct shortages (man-years per occupation) (+)										10. Planned employment over planning period (see notes)
							a transfer in	b training	c overtime	d contract out	e recruiting	f promotion	g job retraining	h other	i total		
* = new occupation at company																	
"Dunkelb" Electronic Technician	167	22.2	-55.2	4	-19.4	-74.6	9.6	10	7.6	-2					-2	22.2	
Machinot	58/39	21.4	-11.4	4	4x-11.4=-4	+11.4	2	10	15.4							21.4	
Machinot - Apprentice	2	60.3	-1.3			-15.4	1.5	1	3.5	-2					-2	60.3	
Welder	38/39	50.6	-11.6				3.36	5	11.6							50.6	
Welder - Apprentice	2							(6)									
Tool & Die Maker	32	40	-8				(2)	1	4	2	1	8				40	
* Electronic Service Technician	0	3	-3					3								3	
Engineering Hydrant Clerk	7	4	3														
Eng. Clerk	3	0	3														
Info. Syst. Control Clerk	5	6.2	-1.2														
Secretaries	5	5	0														
* Data Entry Clerk	0	3	-3														
Eng. Computer Operator	7	13	-6		2.6	-6-6=-1	(2)	1.7	3	1	3				-3	13	
							Column year-2										
Draftsman	4	3	1												-1	3	
Mechanical/Industrial Exp.	15	15	0													15	
Electronic Engineers	4	7	-3													7	
* CAD Programmer	0	3	-3													3	
Foreman	13	17.5	-4.5				(1)	7.5	2.5	2	3				-1	17.5	
Clerical Supervisors	3	3.2	-0.2													3.2	
Eng. Supervisors	2	2	0													2	
Personnel Officer	1	1	0													1	
Admin. Mgr.	1	1	0													1	
General Foreman	1	2.3	-1.3													2.3	
Eng. Manager	2	2	0													2	
Gen. Manager	1	1	0													1	
* Programmer/Analyst	0	1	-1													1	
							From draftsman: 7.5 man-years labour (estimated) while re-training										

Company is recruiting trainee technicians (4) who will contribute one-half man-years of labour input (estimated) each while training

Must recruit extra personnel to cover promotions out

Company must recruit extra personnel to cover transfers out - this causes a small surplus, which is eliminated through restructuring

From purchasing/payroll clerk: .85 man-years input each (estimated) during this period will re-training

From engineering clerk: .75 man-years labour input (estimated) each while re-training

From draftsman: .75 man-years labour (estimated) while re-training

## Schedule 9: Action planning worksheet for individual vacancies

- You can use personnel records or a skills inventory to identify prospective candidates for internal movement into each vacancy (Columns 5 and 6). A sample skills inventory can be found in the supplementary section of the manual
- Using this schedule, you can quickly compare the qualifications of prospective

A) the requirements of the vacant position (to see how training, development etc. is required for each candidate; and  
 B) other candidates (to help you make a final selection).  
 — You should develop consistent sets of

criteria for both the preliminary and final selection of candidates.

- if the final selection of one candidate causes a vacancy to arise elsewhere, be sure to plan for the filling of that newly created vacancy (Column 15)

Page \_\_\_\_\_ of \_\_\_\_\_ this schedule  
Vacancy will arise in the planning  
period from \_\_\_\_\_ 19 \_\_\_\_\_  
to \_\_\_\_\_ 19 \_\_\_\_\_

[illegible]



Supplementary section

- Time series analysis table
- Skills inventory

### Instruction sheet: optional time series analysis table

Rates calculated as part of the manpower planning process (e.g. Manpower requirement indicators – Schedule 1, turnover rates – Schedule 4, retention rates – Schedule 7) can vary over time. An analysis of these changes over time, while not necessary to the manpower planning process, will provide more accurate data for your projections. This analysis also provides valuable insight into your company's productivity and/or workforce stability.

Step	Procedure	Data required
Calculate ratios	<ul style="list-style-type: none"> <li>gather data and calculate rates to be analyzed (e.g. manpower requirements indicators, turnover rates or retention rates) by occupation.</li> <li>Cols. 2, 3, 5, 7, 9, 11: enter calculated rates in appropriate columns.</li> </ul>	<ul style="list-style-type: none"> <li>data for rate under analysis – see appropriate Table in main section of Manual</li> </ul>
Calculate proportional changes	<ul style="list-style-type: none"> <li>Col. 4: subtract the rate 5 years ago (Col. 2) from the rate 4 years ago (Col. 3), then divide the result by the rate 5 years ago (Col. 2), e.g. (Col. 3 – Col. 2) ÷ Col. 2</li> <li>Col. 6: (Col. 5 – Col. 3) ÷ Col. 3</li> <li>Col. 8: (Col. 7 – Col. 5) ÷ Col. 5</li> <li>Col. 10: (Col. 9 – Col. 7) ÷ Col. 7</li> <li>Col. 12: (Col. 11 – Col. 9) ÷ Col. 9</li> <li>Col. 13: average change: total the five proportional changes (Col. 4, 6, 8, 10, 12), then divide by 5.</li> </ul>	<ul style="list-style-type: none"> <li>already collected on Table</li> </ul>
Project rates	<ul style="list-style-type: none"> <li>Col. 14: add one to average rate (Col. 13), and multiply the result by Col. 11 e.g. (1 + Col. 13) x Col. 11.</li> <li>Col. 15: (1 + Col. 13) x Col. 14</li> </ul>	<ul style="list-style-type: none"> <li>already collected on Table</li> </ul>

Indicate ratio under analysis:

Indicate level of analysis:

sales per man-year	_____
units per man-year	_____
turnover rate	_____
retention rate	_____

company-wide \_\_\_\_\_  
department (give name): \_\_\_\_\_  
using data from the 5-year period \_\_\_\_\_  
from \_\_\_\_\_ 19 \_\_\_\_\_ to \_\_\_\_\_ 19 \_\_\_\_\_

[illegible]

### Using skills inventories to fill anticipated vacancies

A skills-inventory is simply a central, comprehensive listing of the skills, abilities, education and other relevant qualifications of each employee in your organization. The information contained in a skills inventory can help you to find qualified applicants within your organization to fill the anticipated vacancies. Each employee in your organization fills out a skills inventory form (see the sample form below). This form could include a quick assessment by the employee's supervisor of the employee's potential.

The information on these forms should be updated periodically (perhaps once a year) to reflect any change in the employee's status. Once the key skills, education and work experience for each vacancy are established (see Schedule 9), qualified candidates can be found by matching the information in the skills inventory to the job requirements. The following techniques, which range from the simple to the complex, can be used in this matching process:

- examine each form in turn, looking for specific qualifications (because the form can be designed with all relevant information on one page, this task is not as difficult as it sounds);
- mark or colour code forms, so that certain qualifications stand out in the files;
- develop lists of employees holding certain qualifications. These lists can be cross-referenced to find people with all the qualifications required;
- each employee's qualifications can be coded and entered or punched on a standard card. Job requirements for a vacancy would also be punched

on a standard card and matched by passing the vacancy card over individual employee cards or by using a light-table and groups of employee cards;

- employee qualifications can be coded and entered in the datafile of a minicomputer (if available). A simple programme could be developed to sort and retrieve qualified candidates.

Employee Skills Inventory

The information in this questionnaire will help in the company's efforts to improve the utilization of its human resources and to plan its training and development activities.

Name

Department

Employee number:

Education				List any skills, abilities, certificates, licences, trades, etc., that you have acquired but which are not noted previously	
	Number of years completed and degree received	Program	Subjects most proficient in	Subjects best liked	
High School					
Community College					
University					
Work Experience				What are your current career interests?	
	Position, title and employer	Skills, abilities, attributes required		How long did you hold this job?	
Current position					
1st previous position					
2nd previous position					
					What are your current personal interests?





